



DECOMMISSIONING
AND CLOSURE
OF THE JOSÉ CABRERA
NUCLEAR POWER PLANT
A commitment to society





JOSÉ CABRERA

NUCLEAR

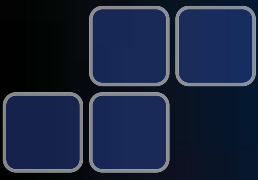
POWER

PLANT

The José Cabrera nuclear power plant, a light water reactor plant (PWR) located in Almonacid de Zorita (Guadalajara), began operation in 1968.

With an electrical output of 160 MWe, it was the first nuclear power plant to begin operation in Spain, and it will be the first to be completely dismantled.

On 11 February 2010, Enresa took over the ownership of the facility in order to carry out its dismantling.



DISMANTLING

OBJECTIVE

The project's objective is the complete dismantling of the facility.

For this purpose, a programme of activities is under way for disassembly, demolition, management of materials and land restoration.

The management of materials is one of the key activities of the project. Its purpose is to optimise the volume of waste to be managed and to encourage reuse and recycling policies.



DISMANTLING EXPERIENCE

The first dismantling project in Spain was carried out between 1991 and 1994 at the Andújar uranium mill. Following environmental restoration, this site is now in the monitoring phase.

The Vandellós I nuclear power plant in Tarragona, partially dismantled between 1998 and 2003, was a ground-breaking scheme both in terms of its magnitude and complexity, and the challenge it represented as the first dismantling of a gas-graphite plant in Spain, and one of the first in the world.

The Vandellós I model is an international point of reference for other IAEA and OECD countries. Following the completion of this work in 2003, the facility is now in the dormancy phase.

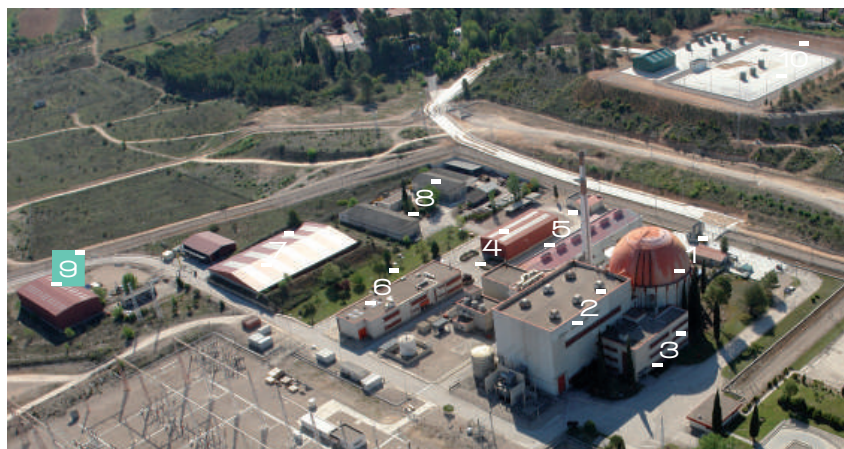
Enresa has dismantled various installations at the Centre for Energy-related, Environmental and Technological Research in Madrid, as part of the Integrated Plan for the Improvement of the Ciemat Facilities (PI-MIC), which concluded in 2015.

Enresa is also involved in various international working groups and projects. Since 2003, it has been an active participant in the Electric Power Research Institute Programme, which gathers expertise from all plants undergoing dismantling in the United States. As well as providing information about our projects, Enresa gains valuable information from this programme for the dismantling of the José Cabrera nuclear power plant, in particular from experience of the immediate dismantling of reactors with similar characteristics.

INSTALLATIONS TO BE DISMANTLED

Various buildings have been altered to adapt them for new uses required during the dismantling process.

1. Reactor building
2. Decommissioning Auxiliary Building
3. Office building
4. Boiler
5. Waste Storage 1
6. Workshops and offices
7. Waste Storage 2
8. Clearance Area
9. Waste Storage 3
10. ISFSI

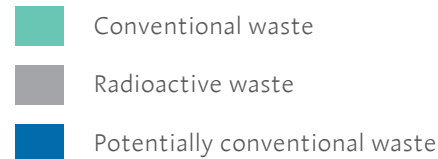
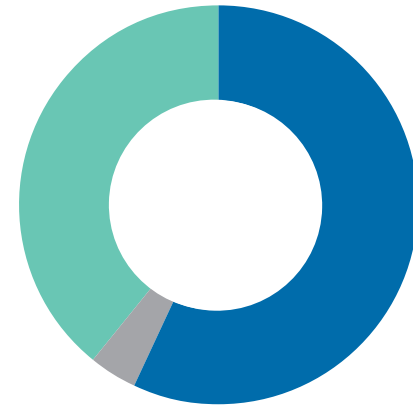




MANAGEMENT OF MATERIALS AND WASTE *

Some 141,000 tonnes of materials is estimated to require management of which only 10% is projected to be radioactive waste. With the exception of certain reactor components, already stored in the plant's Independent Spent Fuel Storage Installation (ISFSI) together with the spent fuel, the remainder radioactive waste will be sent to the El Cabril Disposal Facility (Cordoba), where Enresa manages very low, low and intermediate level radioactive waste.

26% of the material comes from non-radiological zones, so may be managed as conventional material. The remaining 64%, from radiological zones, may be processed as conventional waste following a rigorous monitoring and assessment procedure.



Radiological monitoring system for materials

In order to reduce the volume of radioactive waste requiring management, various optimization techniques are used at the site



THE IMPORTANCE OF SAFETY

Maintaining the highest levels of safety and quality while carrying out the dismantling of the facility is a priority. In order to achieve this, the project entails the fulfilment of numerous requirements for all its actions, in areas such as:

- Quality Assurance and the Environment
- On-site Emergency Plan
- Occupational Risk Prevention
- Radiological Protection
- Management of materials
- Physical Safety

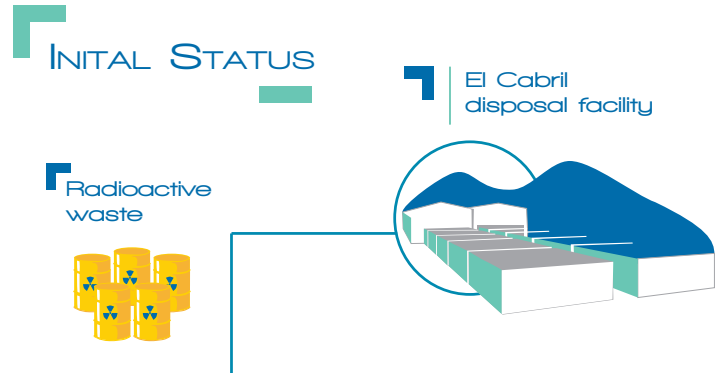




PLANS FOR MATERIALS RESULTING FROM DISMANTLING *

Materials to be managed include the plant's structures and components, the secondary waste produced by the dismantling work itself and the

radioactive waste produced during the operation of the nuclear power plant which is on-site at the start of dismantling work.



Only 10 to 15% of the 104.000 tons of material to be managed at the end of the project will be radioactive waste



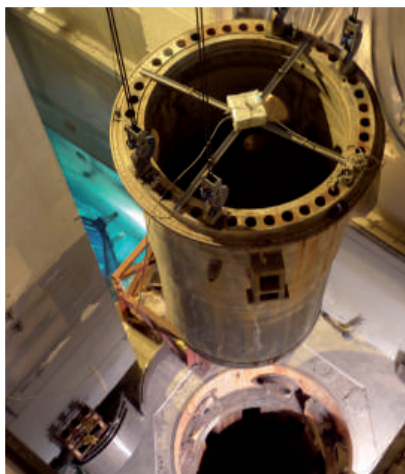


IMPLEMENTATION SCHEDULE

Preparatory tasks for dismantling began after the plant's shutdown on 30 April 2006. Two of the most important tasks were the construction of the Individual Temporary Storage Facility (ITS) and the subsequent transfer of the spent fuel.

In 2010, Enresa took over ownership of the site and began dismantling activities. These included the disassembly of the primary circuit's large components, a truly distinguishing feature of this ambitious project.

ACTIVITY	2010	2011	2012	2013	2014	2015	2016	2017	2018-19	2020	2021
Preparatory activities	████████████████████						████████████████████				
Modification of systems	██████████										
Conditioning of installations	████████████████████						████████████████████				
Conventional dismantling	████████████████████						██████████				
Radiological dismantling			████████████████████								
Large components			████████████████████								
Other components			████████████████████								
Decontamination and demolition						████████████████████					
Management of materials		████████████████████									
Final radiological surveillance										██████████	





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